

# More Ontario lakes yield healthy fish

At the beginning of the 1980 fishing season Environment Minister Harry C. Parrott released the 1980 editions of bilingual booklets containing information on the quality of fish in Ontario waters.

The research on which the information is based revealed a steadily improving story over the initial tests published in 1977 with results from 167 lakes and rivers.

"The 1980 editions provide the results from tests completed to date on more than 54,000 fish taken from 878 lakes, rivers and parts of the Great Lakes," Dr. Parrott said. "The results completed last year on 11,000 fish from 253 new lakes continue to confirm that the majority of Ontario's waters yield healthy fish."

Data in the new publications assess possible contaminants such

as mercury, mirex, polychlorinated biphenyls (PCBs), and DDT and provides the public with recommended levels of consumption for fish tested.

Summarizing the complete results from 878 lakes and rivers tested to date:

In 94.3 per cent of the water bodies tested (or 828), some or all sizes and species of fish were found to be suitable for unre-

stricted consumption (i.e. 21 meals per week);

In only 5.5 per cent of the water bodies tested (or 48), the guidelines recommend restricted consumption of all species and sizes tested;

In only 0.2 per cent of the water bodies tested (or 2), do the guidelines recommend no consumption of any fish tested. These two locations are on the Wabigoon River below Dryden and in Clay Lake on the Wabigoon River. On Clay Lake, a Federal-Provincial task force is investigating possible remedial measures to counteract the mercury problem.

Dr. Parrott emphasized that contaminants which have been detected in fish through the testing program have never been found in sufficient quantities to make any of

Ontario's lakes and rivers unfit for swimming or as a source of treated drinking water.

Copies of the free bilingual booklets, "Guide to Eating Ontario Sport Fish," for the Great Lakes, Southern, and Northern Ontario, are available from any office of the Ministries of the Environment, Natural Resources, or Northern Affairs, and from L.C.B.O. and Brewers' Retail outlets in vacation areas during spring and summer.

Tests of fish from more than 200 lakes and rivers are planned by Natural Resources and Environment during 1980. Results will be published next spring and, in the past, environmental health bulletins will be issued on a routine basis as new data become available.

## ENVIRONMENT ONTARIO LEGACY

Vol. 9, No. 1

May - June, 1980

### Ontario sets example

# INCO to cut emissions

INCO Limited will be issued an order to substantially reduce emissions from its Sudbury smelting complex. Environment Minister Harry C. Parrott announced in the Ontario Legislature.

The proposed Control Order program calls for:

- A freeze on SO<sub>2</sub> emissions to a total maximum average of 2,500 tons per working day from the Copper Cliff smelter complex, when the Control Order takes effect. This will consist of a combination of stack and ground level emissions which can vary from 50 to 200 tons per day.
- Installation of facilities necessary for further reduction to a total average of 1,950 tons per day by the end of 1982 and these facilities to be in full operation and compliance by June 1, 1983.
- Long-term reductions in sulphur dioxide discharges after 1982. The new program under

The Environmental Protection Act will direct the company to investigate and report by December, 1981, on methods required to reduce its emissions to the lowest possible level.

- Restriction of sulphur dioxide from the iron ore recovery plant to an average of 250 tons per day, to take effect when the Control Order is final.
- Continuation of an existing program designed to bring all low level emissions from the company's nickel refinery into compliance with provincial standards as set out in The Environmental Protection Act. The company must complete installation of the necessary facilities and have these in operation by December 31, 1982.

At the same time, Dr. Parrott said, a Canada-Ontario task force will investigate all technical air pollution abatement options for INCO Ltd. and for Falconbridge Nickel Mines in Sudbury aimed at reduction of emissions to the lowest possible levels.

At a meeting to be held in Sud-

bury, the public will have the opportunity to examine details of the Control Program and to make comments before the Order becomes final.

SO<sub>2</sub> emissions from INCO's facilities in Sudbury have already been reduced by 40 per cent from their 1969 level of 7,000 tons per day.

"The company has not been operating at full capacity during the past two years due to current world demand for nickel. Emissions since last June have been well within the limit of our existing Control Order," said Dr. Parrott.

"The new program clearly places a limit on production increases in the short run and there is a strong incentive for the company to develop cost-effective technology and methods of reducing emissions to the lowest possible levels."

It is anticipated the new Control Order will take effect July 1 after the company and the public have had an opportunity to review and comment on the proposed program.

## Immediate steps required

The proposed order requires immediate steps to limit total sulphur dioxide from the Copper Cliff smelter to a maximum of an average of 2,500 tons per working day to be computed quarterly over a 12-month production period. Average daily emissions will be calculated at the end of each quarter on the basis of working days and emission totals during the previous accumulated 12-month period.

Total emissions from the Copper Cliff smelter complex and all other INCO sources in the Sudbury area must be controlled so that ground level concentrations do not exceed 0.5 parts per million (ppm) hourly or 0.15 ppm daily.

The order also sets a limit of an average of 250 tons per working day for sulphur dioxide emissions from the iron ore recovery plant and a maximum hourly average

ground-level concentration of 0.25 ppm.

The ministry's system of day-by-day monitoring will continue under the new order and applies to both plants.

The company is required to file a daily plan every morning for operation of pollution control systems with the ministry's regional office and a detailed report on actual daily operation.

The new order will also call for a report and an implementation schedule by the end of 1980, on the facilities required to reduce emissions from Copper Cliff smelter to 1,950 tons per working day. Installation must be completed by December 31, 1982, and the facilities must be fully operational by June 1, 1983.

A provincial officer's requirement which will also be served on the company requires full reports by December, 1981, on improved

## Bay of Quinte looks better



A summer student, working for the Ministry of Natural Resources, extracts a small mouth bass from a net — one of the first to return to the revived Bay of Quinte. More about the rebirth of the Bay on pg. 3

pollution control technology now being studied by the company, including a new pilot operation in the Thompson, Manitoba, facility.

The direction also calls for further investigation of other new technology to reduce ground-level emissions and to include economic feasibility, effectiveness and other social, economic and environmental considerations.

Dr. Parrott said he discussed

Ontario's action plan to reduce emissions throughout Ontario and especially at INCO with John Fraser, the previous minister of Environment Canada, and with Douglas Costle, administrator of the U.S. Environmental Protection Agency. Canadian Environment Minister John Roberts was briefed on the proposed program on April 21.

(continued on page 8)



## It's all one world...

# Freons reduce ozone shield

About 300,000 to 600,000 new cases of skin cancer are registered in the U.S. yearly. These cases result in about 5,600 deaths, reports the U.S. National Academy of Sciences.

The cause of these skin cancers is the so-called damaging ultraviolet radiation emitted by the sun in wavelengths between 290 and 320 nanometers.

Earth is shielded from most of this type of radiation by the stratospheric ozone belt. The concentration of the use of hydrofluorocarbons (freons) at the rate they were used in 1977 will reduce the ozone concentration in the stratosphere by 16 per cent.

Such a reduction would increase the amount of dangerous ultraviolet radiation reaching Earth by 44 per cent. This would in turn lead to "a certainty of very many thousands of skin cancer cases

every year" and a corresponding increase in skin-cancer-caused fatalities, reports the Academy.

The increase in damaging ultraviolet radiation would also affect plant and animal life. It is, however, difficult to predict the size of this effect, mainly because this subject has not been sufficiently investigated.

To control the depletion of the protective ozone layer, the Academy suggests a number of measures, among them:

- a ban on the use of freons as aerosol propellants,
- application of the best available technology to reduce emissions of hydrofluorocarbons by industry,
- implementation of quotas for the use and production of hydrofluorocarbons, and
- controlled disposal of domestic and commercial refrigeration equipment to prevent leakage of the freon they usually contain.

## Mortality rates decline

Between 1968 and 1978 the age-adjusted mortality rate from all causes has declined "in North America by 18.6 per cent, nobody really knows why North

Americans are generally getting healthier, reports the U.S. National Academy of Science's Institute of Medicine.

Among the causes of death the

## West Indies clean-up

A Caribbean Action Plan devised as a first step to control pollution in the Caribbean and in the Gulf of Mexico has been devised by the United Nations Environment Program. It aims not only for the control of pollution of these seas, but also of environmentally destructive enterprises started by developing countries in their eagerness to build up industry.

UNEP's plans include the establishment of numerous data collecting units throughout the area for the monitoring of oil, heavy

metals and pesticides in sea water and the drafting of contingency plans for oil tanker accidents, hurricane warning systems and early warning systems for volcano eruptions and earthquakes.

Some of the other problems the program wants to deal with are the destruction of mangrove swamps and coral reefs, the disappearance of the tropical forest, the loss of the genetic pool in livestock and crop species.

The eventual cost of the pollution control plan is estimated at \$120 to \$130-million.

age adjusted mortality rate for cardiovascular diseases declined by 24.6 per cent, for coronary heart disease by 25.2 per cent and for cerebro-vascular diseases (stroke) by 37.7 per cent.

Among the major causes of death only cancer, suicide, homicide and chronic obstructive

pulmonary diseases have taken an increasing toll since 1968.

The increase in the death rate from cancer by 3.1 per cent over the 10 years is largely due to the sharp increase in lung cancer cases, which rose by 31.2 per cent while the overall rate for all other cancers decreased by 4.1 per cent.

# Ontario will fight U.S. coal conversions — Parrott

The Ontario Government's attitude toward a U.S. proposal to convert more than 100 oil and gas fired utilities to coal was one of the main subjects of a letter Ontario Environment Minister Harry C. Parrott addressed to the newly appointed federal environment minister, John Roberts.

"You can appreciate our concern considering that the majority of these utilities would be in the northeast United States and that the plants, generally, would be exempt from federal environmental regulations and subject only to the less stringent state air quality plans," wrote Dr. Parrott. "These conversions, which may increase sulphur

dioxide emissions from U.S. sources by 25 per cent, were not included in the forecasts presented by the head of the U.S. Environmental Protection Agency at a recent meeting of ministers attended by your predecessor, the Honorable John Fraser.

"Because of the potential for transboundary damage, this province opposes conversions to coal which are exempt from U.S. federal regulations. Such conversions must compound the problems associated with the grandfather clause in the U.S. Clean Air Act, which not only protects existing plants from provisions of the Act but allows such plants to expand,

increasing their sulphur dioxide and other emissions.

"This willingness on the part of U.S. authorities to allow increases in sulphur dioxide and other emissions from U.S. sources is certainly at wide variance with the approach taken by official U.S. sources, including the U.S. EPA and the Minnesota Pollution Control Agency (MPCA) regarding possible transboundary effects from emissions from the proposed generating station at Atikokan, Ontario.

"Comprehensive studies of the Atikokan generating station concluded that emissions from this station, based on worst case as-

sumptions, may occasionally be in excess of the Class I Standard permitted under the Prevention of Significant Deterioration Criteria". Nevertheless certain official U.S.

## Little or no emission changes...

agencies, including the U.S. EPA, have continued to be publicly critical of this plant which was designed and approved for construction some years before the U.S. Clean Air Act Amendments of 1977 were promulgated and the U.S. Boundary Water Canoe Area was declared a Class I area.

"Further, the State of Minnesota has permitted at least two existing power plants (Clay Boswell and Sherbourne) to increase their capacity without application of the Clean Air Act amendments regardless of the fact that emissions from this added generating capacity alone will increase airshed emissions by a greater extent than the total emissions from Atikokan.

"In addition, with the lifting of a moratorium on mining, the State of Minnesota will allow a new copper-nickel smelter in the Superior National Forest adjacent to the BWCA. Emissions from Minnesota will be further in-

creased when a local taconite plant converts from oil to coal.

"To our knowledge, unlike Atikokan where the two mining companies will close prior to the generating station coming on line, resulting in little or no changes in over-all emissions, there is no trade-off planned by either the U.S. EPA or the MPCA to compensate for the increased sulphur dioxide emissions from U.S. sources.

"Preparatory to the signing of a Canada-U.S. Agreement on Air Pollution, and prior to our next meeting with the United States on this subject, I would like to see the Committees of Federal and Provincial Ministers reconvened to review the material being prepared by the Federal-Provincial Management Board on Acid Rain to ensure that a fully co-ordinated Canadian effort is being assembled for the further technical discussions with environmental officials of the U.S. Government.

"I am now deeply concerned about the direction of U.S. policy as it affects our environment and wish to express to you as I have to your predecessor my earnest desire to be fully supportive of efforts to resolve our many pressing environmental problems, especially the large-scale problem of acidic precipitation where concerted U.S. efforts are fundamental."

## Inco's chairman promises co-operation

After Environment Minister Harry C. Parrott announced in the Legislature the Control Order program designed to reduce SO<sub>2</sub> emissions in Sudbury, Inco's chairman and chief executive officer, C.F. Baird, held a press conference at which he reaffirmed his company's commitment to reduce the level of emissions.

"The level of SO<sub>2</sub> emissions at Sudbury is due to the high sulphur content of the ore—a natural chemical fact—and the large size of our operations. We are not guilty of negligence or failing to try, we simply face a large and difficult task," Mr. Baird said.

"We have reduced emissions by about 55 per cent from the level of almost 7,000 tons a day in the 1960s. Two research projects are under way that may enable us to make substantial additional reductions. These involve improved pyrrhotite separation and a new smelter technology."

"Yet, as Inco's emissions have declined sharply, the acidity of rain has increased dramatically. There obviously are many other

sources," Mr. Baird said.

"The great significance of the new limit is that it limits our nickel production to about 280 million pounds per year. This is about 60 million pounds below our current environmentally restricted nickel capacity. At the cost of a typical new nickel project today, 60 million pounds might represent an investment of about \$700 million."

"The second key provision of the proposed order would require a further reduction to 1,950 tons per day by mid-1983. We hope we will be able to achieve this emission level—primarily through implementation of the new pyrrhotite separation process—without limiting nickel production again. But we cannot be sure until we have proven the process."

Mr. Baird affirmed that "a cleaner environment is desirable; it has a real value itself, and we are prepared to bear our share of the costs."

"To do this the company will continue working hard to reduce its emissions. Hopefully, we will be able to accomplish reductions

through methods that balance all interests—not just the interests of the company, but also our employees, the Sudbury community, this province and Canada. If not, we will be faced with alternatives that either limit growth, reduce production and employment, or achieve emission control at the sacrifice of good resource conservation practices and possible economic penalties," Mr. Baird said.

"The laws of Ontario provide for an appeal of a Control Order. If we do appeal, it should not be viewed as opposition by the company to reducing emissions, but only as the exercise of an established right to have the terms of this particular order reviewed."

"We believe there are basic issues involved that the people of Ontario should consider. I know that many believe that Inco has not always been prepared to assume its part in that process. If that ever was true, it no longer is. We want the issues and our role understood."

"Let's go forward with that process right now."



Ministry  
of the  
Environment

Hon. Harry C. Parrott, D.D.S.,  
Minister  
Graham W.S. Scott, Q.C.,  
Deputy Minister

Published bi-monthly by the Ministry of the Environment, Information Services Branch, 135 St. Clair Avenue West, Toronto, Ontario, M4V 1P5 for those interested in the many facets of environmental enhancement. Reproduction of articles authorized without further permission. Second Class Mail Registration Number 4168

Editor ..... Robert Koci  
Director of Information Services ..... R.J. Frewin





In this photo, taken before clean-up of the Bay of Quinte, commercial fisherman Joe Larch shows the damage done by algae and aquatic plants to one of his nets. It took months of drying and cleaning to make the net usable again. (Photo: R. Truman)

## Project Quinte:

Ron Truman is a freelance journalist living in Trenton, Ont.

# Crayfish are coming back to Belleville

by Ron Truman

Hidden away among the cries of doom there are some success stories in ecology. The recovery of the Bay of Quinte is one of them. Project Quinte is the code name for a scientific study that led to the recovery of this body of water from phosphorus overloading.

Project Quinte is significant not only because it documents recovery rather than deterioration, but also because scientists from various institutions have organized themselves into an ecosystem approach to the problem, and have achieved excellent results at a relatively low cost.

Today, you don't have to ask a scientist to find out that the Bay of Quinte — a shallow, z-shaped inlet of eastern Lake Ontario — is healthier. The water looks better, smells better, and larger numbers of desirable types of fish are caught in the bay again.

A decade ago the bay was choking on algae — plankton fertilized by excess phosphorus in the water. Between Trenton and Belleville, biomass levels were phenomenal, the highest Ken Nicholls of Environment Ontario's plankton taxonomy unit had ever recorded or seen in the literature.

Water transparency was low. The bay was murky from ice-out to freeze-up, with spectacular summer blooms of algae. Boat hulls and shorelines accumulated thick layers of green slime. Swimming in the bay could be dangerous to health.

Drinking water suffered. At Belleville, for example, algae continually clogged the intake valves of the purification plant. One

scientist described the quality of finished Belleville water as "raunchy." City politicians discussed running a pipeline to Lake Ontario to get a clean source for their drinking water supplies.

Fishing deteriorated. New species of fish shunted aside the pickerel (walleye) and yellow perch which once made the bay a sportsmen's paradise.

Fish populations, studied for decades at Glenora, began to fluctuate madly. First one undesirable species, then another, dominated the waters.

### ...fish populations fluctuated madly

Today, residents of the Quinte area are delighted with the overall improvement in the water and are quick to relate it to sewage treatment. In Trenton, Belleville, Napanee and Picton, cleaner water is the return on a sizable investment. The improved sewage treatment was a result of an Ontario-wide program.

Scientists began studying the bay long before the plants went on stream. They co-ordinated their work from three levels — provincial government departments, federal departments and universities. Then they met annually to compare notes, produce summaries. The result: they recommended phosphate removal.

At the end of the 1970s, after two years of effective phosphorus control, the bay began to stir back to life.

Water transparency improved

by about 50 per cent on the average. Near Belleville, phosphorus levels fell by 35 per cent, nitrogen levels by 20 per cent, and the sheer bulk of algae by nearly 80 per cent.

Fish populations continued to fluctuate, but this time in favor of the desirable species. The white perch population collapsed. A harsh winter at the end of the 70s may have accelerated this development. At any rate, anglers are now enjoying some of the best catches of yellow pickerel in memory.

Some smaller aquatic organisms, unseen for years, checked in again. Pollution-sensitive mayfly larvae and crayfish were found near Belleville, a truly extraordinary event.

Scientists had anticipated the improved transparency and the lower levels of algae. They knew already that phosphate control should give these results. But they can't explain the return of the fish. No one anticipated a response of such dimensions.

### ...nobody expected fast response...

Confirming improvements in other areas has been difficult. When the Queen's University team of Michael Bristow and Adele Crowder looked for evidence of regrowth of the rooted water plants, they were disappointed. Their survey failed to find more extensive weedbeds, possibly because their methods couldn't pick up small changes.

The failure to find the right kind of evidence to understand the link between phosphate control and the recovery of the fishery hasn't diminished enthusiasm for Project Quinte. Murray Johnson of the Canada Centre for Inland Waters described the developments in the bay as proof that phosphate control there was "the best investment in pollution abatement ever made anywhere."

### off-limits on development...

As the ice went out in the bay this spring, the scientists were back, probing the waters, hoping to accumulate data that will confirm their optimism about the long-range benefits of phosphate control.

Environment Ontario is looking to the future, too, and considering the consequences and conditions of phosphate control. It also fears that a relaxation of vigilance may bring back a deterioration of water quality.

Pollution control plants are removing phosphorus and producing an effluent that contains only 0.5 parts per million in the summer. This is as good as a result as can be achieved with today's technology.

But the water in the bay can take only so many pounds of phosphorus. If population densities along the bay increase without improvements to phosphorus removal, the bay could become overloaded again. A doubling of the popula-

tion in the watershed could lead to such a deterioration of water quality.

Environment Ontario's regional office in Kingston has raised the question of alternative controls of phosphorus pollution. One of them is the placing of limits to the development of the watershed. The reaction to this suggestion was not very favorable.

Jack Christie, the Belleville city manager, made headlines when he condemned it.

"We must be prepared if we want to forestall the reversal of the water quality," he said.

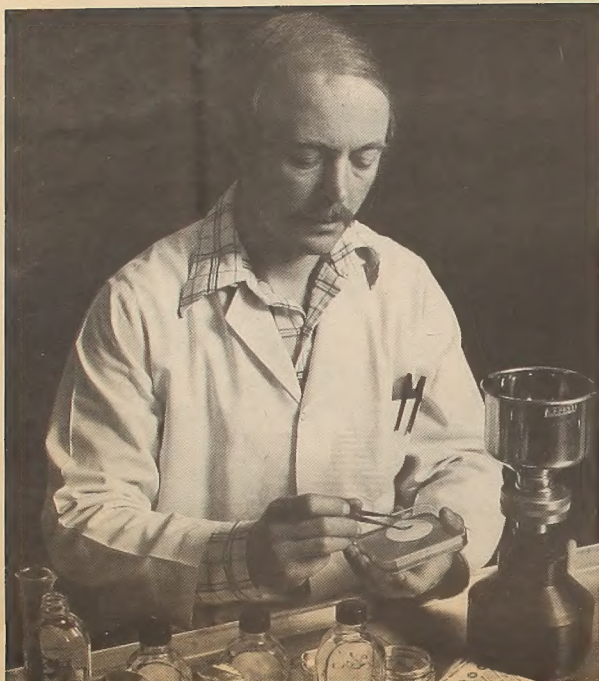
"There are more ways around the problem than limiting development. Look at the basis of the problem. People are using phosphorus in food. Then they're dumping it into the water."

"There must be a breakthrough. Maybe we'll find some way of returning the phosphorus to the land, using it as a soil conditioner rather than dumping it into the bay. Ontario is already a leader in this kind of research. What is needed is more funding."

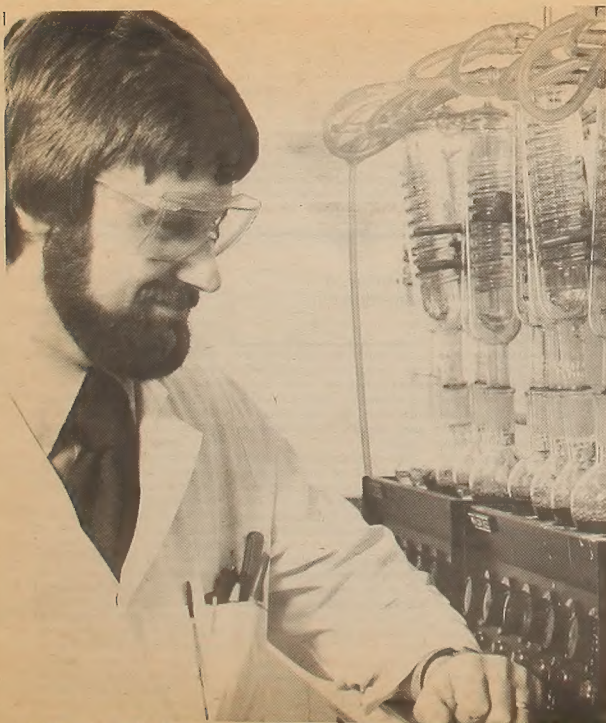
"We've already been through so many tough situations with the water quality problem. Everyone in the area has supported the clean-up, right from the time when housewives voluntarily stopped using high-phosphate detergents. The municipal politicians have stood by decisions that were unpopular because of their cost."

"I know that water quality is important to people. When the water first started to look better in the bay, people would stop me on the street to thank me for what the organizations involved had been doing."





Jim Hansen, microbiology lab technician, works on the millipore filtration apparatus to check a sample for coliform bacteria.



Jeff Taylor, chemical lab technician, checks the oxygen demand testing equipment, used for the testing of effluents from water pollution control plants.

## Thunder Bay lab 240,000 square northwestern Ontario

By Adrian Jackson

Three years ago, in May, 1977, Environment Ontario Northwestern Region's laboratory moved from cramped quarters in a former bakery to its new, modern building in the Thunder Bay Provincial Complex on James Street.

"The move improved significantly Environment Ontario's capability to attend to the analytical needs of the northwestern part of the province," explains R.M. Gotts, regional director.

"Prior to the move to the new facilities, many samples had to be sent to the Toronto central laboratory for analysis. Since many samples require analysis within 24 hours, the establishment of a regional laboratory enables analysis to be carried out more quickly after sampling and, therefore, the results to be more reliable."

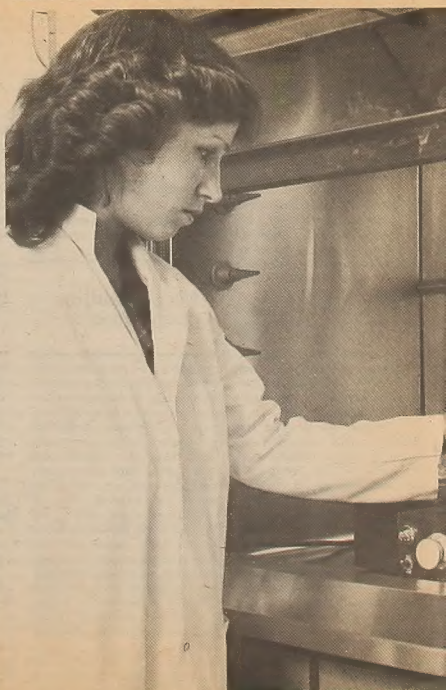
"The Northwestern Region covers an area of about 240,000 square miles, and our scientists and technicians must often travel great distances to reach sampling sites", said Mr. Gotts. "The difficulties

are compounded during our long and cold winters and it is obviously of great benefit to be able to submit samples and have them analyzed locally."

In the laboratory, chief of laboratory services, Al Perras, explains the operations.

"On the main floor of the building are the individual laboratory areas, of which nine are used for chemical analysis, three for microbiological analysis, two for biological analysis and one for phytotoxicology studies — studies on the effect of air pollution on vegetation. In addition, the main floor includes shipping, sample reception, sterilization, glassware washing, storage, instrument repair, equipment repair, meeting and office areas.

"In the laboratory, over 100,000 tests and studies were performed last year. The laboratory has a complement of 13 but approximately 20 persons frequently use its facilities. These include the laboratory chief, 4 scientists, a biologist, 12 technicians



Eva Dipaolo, chemical lab technician, is involved in the analysis of water samples.



# laboratory serves e miles of Ontario

Adrian Jackson is chemistry scientist at the Northwestern Regional laboratory.

and a secretary. During the summer, 10 to 15 students are employed in several areas of the laboratory.

"The regional laboratory's chemistry section processed about 7,000 samples in 1974 and this number has increased to about 13,000 samples in 1979, although the number of tests performed has remained quite constant at 55,000-65,000 tests per year.

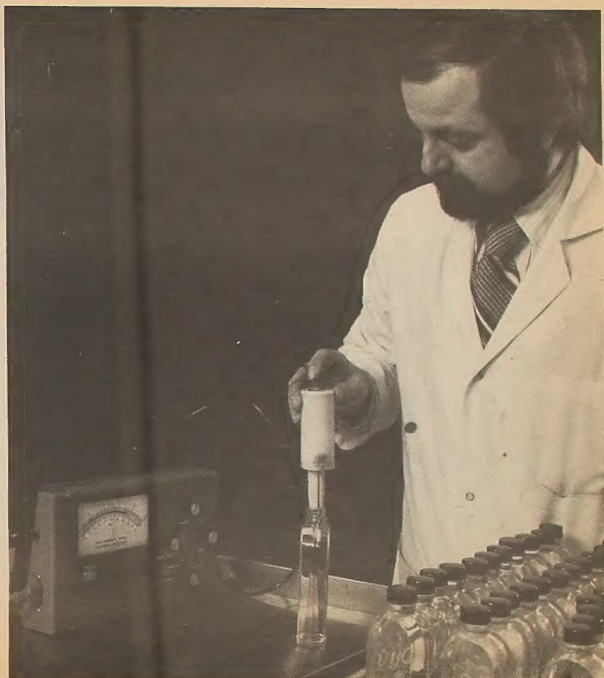
"Similarly, the microbiological section processed about 10,000 samples in 1974 and about 14,000 samples in 1979, while the number of tests has been constant, around 30,000-35,000 tests per year."

The samples received are analyzed for a wide variety of parameters, depending on their source and the purpose for which they were collected. The Northwestern Regional laboratory has the capability to analyze samples for approximately 50 parameters which include such metals as mercury and arsenic and also such "pollution indicators" as BODs, coliform, bacteria, nutrients and

alkalinity (important in acid rain studies).

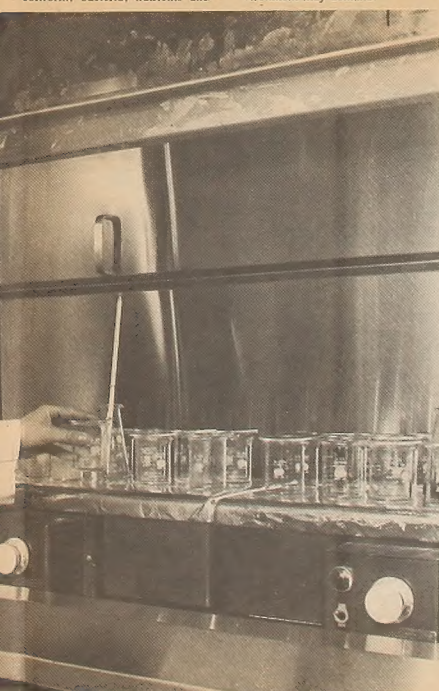
Automated systems are used for many analyses, and a comprehensive program of analytical quality control is maintained. The analytical methods used are periodically checked by participation in the federal Government's Canada Centre for Inland Waters Inter-laboratory Quality Control Studies, and the International Joint Commission's similar Inter-laboratory Studies.

The laboratory staff and facilities are well prepared to adapt and to respond to future needs — among them the closer supervision of the pulp and paper industry, and the study of the impact of acidic precipitation on vegetation and wildlife. Administration is being streamlined to possibly accommodate some analytical requirements of the neighbouring Northeastern Region and to increase the "laboratory's ability to respond to any requirements the protection of the highly sensitive northern environment may demand.



Adrian Jackson, chemistry scientist, reads a five day biochemical oxygen demand indicator.

(All photos: Tessa Buchan)



er samples for their content in metals, especially arsenic.



Stewart Irwin, microbiology scientist, inserts microbiological samples into an autoclave to destroy bacteria in a sample.



# Environmental education



(Photo: Environment Ontario)

## Exploring nature with handicapped

The Ontario Ministry of the Environment, in co-operation with the Provincial Council of Ontario/Scouting with the Handicapped Advisory Committee, has just released its new manual entitled, "Exploring the Environment with the Handicapped". The book contains 12 different areas of environmental study from astronomy to waste management, as well as a chapter on tips for working with the handicapped. Each study topic is followed by brief notes on how to adapt the activity to meet the needs of children who are vision-impaired, deaf, mentally or physically handicapped.

"Exploring the Environment with the Handicapped" will be of particular interest to teachers and to Boy Scout and Girl Guide leaders working with "special" children.

The manual was prepared by Environment Ontario as one of its International Year of the Child projects. Draft copies were distributed to members of the Boy Scouts' committee for scouting with

the handicapped for their comments and suggestions. Their remarks were incorporated into the final copy.

The book is available for \$3

(please make all cheques payable to the Treasurer of Ontario) from the Ontario Government Bookstore, 880 Bay Street, Toronto.

## Environment workshop with a difference

Nearly 70 Ontario teachers and educators who work regularly with handicapped children attended in May a three-day environmental studies workshop sponsored by Environment Ontario at the Bolton Outdoor Education Centre.

"This is the third workshop for teachers of handicapped children we have staged at Bolton," said Murray Cheetham, education and public affairs co-ordinator for the ministry. "The first two we held were so successful, we were requested to continue this special learning experience for teachers. The doubling of our registration for

this year confirms the interest in the workshop."

The ministry workshop has three objectives:

- To assist special education teachers in developing a greater awareness of the philosophies and instructional techniques used in the environmental education.
- To acquaint the teachers with existing environmental teaching units.
- To demonstrate the use of these methods and facilities as supplementary teaching tools in the total education process.

## How to be a naturalist

by Jane Watson

As I watch my children growing up so quickly, I often question which values I should try to instill in them to help make their adult lives rewarding, happy and productive.

There is, however, one thing that I am positive that I want to leave with them — a love of nature. If I could help my children to become naturalists, I feel that I will have given them a special gift for their adult years.

By dictionary definition a naturalist is "one versed in natural science, especially a student of plants or animals."

### ...learn to enjoy and appreciate...

To many casual observers, a naturalist is synonymous with the words, "boots, beards, bleeding hearts and biota\*." He or she dresses outlandishly in boots, jeans and a lumber jacket; has a beard and/or unruly hair; is quite vocal about expressing concern for the fate of some tree, bird or stream and speaks a vaguely familiar science class jargonese.

But to me a naturalist is one who learned to enjoy and appreciate the beauties of nature. He or she may be a busy executive or a blue collar worker, a grade school or college graduate, an eighteen or eighty year old. A naturalist is both the elderly gentleman who maintains a feeding station for birds over the winter because he delights in watching their antics and the little girl who flops herself down on the lawn to observe a trail of ants.

A naturalist seems to enjoy life a little more than his peers; he is usually a relaxed person because his pace is a little slower than that of many of his associates and he seems to be in touch with himself and the world around him.

A naturalist takes time to watch a sunset, a bird fly or a snowflake fall. He or she may not spend much time outdoors, but he pauses to gaze at the sky before shutting the curtains at night. He knows the fragrance of the air just after a rain-shower and he can tell you

where on his way to work the first flowers are beginning to poke their heads.

Becoming a naturalist is not like acquiring a hobby for there is nothing to buy, nothing to show off to friends and no competition. Certainly, hobbies and even jobs can spring from a love of nature just as they can encourage a person to become a naturalist. But in essence "naturalism" is a quality of heart — a way of life.

Few persons are born with a love of nature. It is something developed over the years through personal observation, a bump of curiosity and/or the encouragement of family, friends, or a teacher.

If you yourself don't have a "naturalistic" bent yet but would like to foster one or to encourage your children, here are a few simple suggestions:

1. Walk whenever and wherever possible and don't use just your feet. Use your nose to identify new odours; use your eyes to pick out things just off your immediate path; feel the sun, wind, or rain on your face; try to identify background noises.
2. Find something you have never seen before on every walk you take — even if it is just a walk around your office building on your lunch hour.
3. Sit in your backyard, on your balcony or near a lake and listen to the symphony going on around you.
4. Spend two minutes staring at the sky before you shut your curtains at night.
5. Keep a daily record of weather conditions. (If followed up by discussion, this assignment can help a child holidaying in a foreign country to understand the difference in food production, labour habits.)
6. Carry a small pad and pencil. Make lists of things happening outdoors. Note the signs of the changing seasons.
7. Pick a favourite plant or tree and watch what happens to it as the seasons pass.
8. In the summer, spend a few minutes and practice "belly botany". Lie on your stomach on the grass and look closely at the world at your feet.
9. Change the colour of your outdoor lights and discover which colours the various species of insects prefer.
10. The next time you see a "creepy crawler" don't shy away. Look at it closely and notice its colorings, number of appendages, locomotive ability, etc. Find something good to say about it.

\* Biota is a scientific word meaning "all the species of plants and animals occurring within a certain area"



## Report from Scandinavia:

# Acid rain — no hard evidence on effect on plants

The effects of acidic precipitation on vegetation, on soil and on fish were the main subjects of a five-year study by Scandinavian scientists. At the conclusion of this study the participating scientists and their colleagues from all nations affected by acid rain met at a week-long symposium at Sandefjord, Norway, to discuss their findings.

Ed Piche, co-ordinator for Environment Ontario's acidic precipitation study; Nels Conroy, chief of the water resources section, Northeastern Region; Sam Linzon, supervisor of the phytotoxicology section of the air resources branch; Tom Brydges, supervisor of the limnology and toxicity section, and Peter Dillon, head limnologist of the water resources branch, represented Environment Ontario.

"We know that acidic precipitation affects the quality of water in lakes and their fish population," said Dr. Linzon on his return. "But as yet we have no hard evidence that current inputs of acid rain are affecting the growth of natural vegetation."

## vegetation depends on rainfall

In laboratory situations spraying with acidic water can produce visible effects, like the erosion of plant cuticles, lesions on leaves, leaching of nutrients and others. But up to now no connection can be formed between these effects of strong acidic solutions in laboratories and the effects of acidic precipitation on vegetation in nature.

"In nature," Dr. Linzon explained, "vegetation depends on rainfall. As rain is naturally slightly acidic, plants can tolerate a degree of acidity. Some research even indicates that the increased supply of sulphur and nitrogen in acidic precipitation may act as a fertilizer."

The same applies to tree growth. Here the definition of the influence of acidic precipitation is very difficult. The growth of trees depends on so many variables, as climate, soil condition, type of tree, altitude, competition with other growth, that it is as yet impossible to show a direct cause and effect relation between tree growth and acidic precipitation.

At the symposium all scientists, foresters, agronomists and horticulturists agreed that at present there is no visible effect of acid rain on vegetation.

"We are, however, worried that if things get worse, effects similar to those found in laboratories may develop," Dr. Linzon said.

A major source of concern at the symposium was the role of soil in the chain of events that leads from SO<sub>2</sub> emissions to the decrease of fish population in some lakes.

Practically all rocks and soils contain chemically bound aluminum. When this aluminum

becomes ionized by acidic precipitation, it starts to move from the soil into watercourses. The combination of higher acidity of lake waters and higher aluminum contents kills fish populations.

An important contribution to the understanding of the effect of acid precipitation on soils was a paper presented by Dr. Linzon at the symposium. Dr. Linzon based his study on soil surveys conducted in 1960 in the Parry Sound district, in which a number of data were collected from samples of 26 different types of soils found in the area.

## soil acidity compared

Dr. Linzon compared the 1960 soil acidity data with results obtained from the same locations in 1978. He found that soils which were acidic in 1960 showed about the same acidity 18 years later, whereas soils with lower acidity in 1960 showed higher acidity in 1978.

This may help explain why two nearby lakes can have different acidities if the soil in their drainage area is different.

It also shows that lakes and soils of the same area may have a different sensitivity to acidic precipitation. "Soil and vegetation are an important link in our understanding of the effects of acid rain," Dr. Linzon said.

To increase this understanding in Ontario the ministry's terrestrial effects working group, chaired by Dr. Linzon, is starting in 1980 a study of the soil in the areas in which acidic precipitation is monitored. The data gained in this study will form an important base for the measurement of the future influence of acid rain on soils and vegetation.

## Ontario contributes

Both, Dr. Linzon and Dr. Brydges were surprised by the controversy caused at the symposium by a paper presented by a Swedish researcher, Dr. J.T. Rosenqvist, who argued that the acidity of watercourses is not caused by acid rain, but by changes in land use and the resulting acidification of the soils surrounding the watercourses. Most of Sweden's acidic lakes lie in areas where land use has changed in the past, resulting in major changes in vegetation.

Ontario's experts contributed to the discussion of Dr. Rosenqvist's paper by providing data from acidic lakes showing increased lake acidity in areas in which land use has remained unchanged since the Ice Age.



Powdered lime is sprayed from a moving truck onto the ice and snow of a river in Sweden. When the ice melts, the lime neutralizes the water at a time when the impact of acidity is greatest.

## Sweden limes its salmon rivers

To control acidification of watercourses, Sweden started an extensive lake liming program in 1978, and some of the ministry's representatives visited some of the limed areas.

"Sweden's main problem," Dr. Brydges said, "is the protection of their salmon sport fishery and of their salmon runs. The liming concentrates therefore on rivers and on their headwaters, although in some cases lakes have also been limed. Liming actually started well before 1978 as a government make-work project."

Whether the liming of the watercourses is effective is not yet fully clear. In some cases liming has led to fish kills because the aluminum leached out from the soil in acidified lakes precipitates in the neutralized stream and is taken up by resident fish populations.

Watersheds directly affected by the Swedish liming program cover an area of about 6,000 square kilometers, and about 120,000 tons of lime have been spread in about two years.

Experience gained in this pro-

gram may be applicable to some Ontario lakes, once the procedure and its effects are fully understood.

"All in all," Dr. Brydges said, "I have the impression that the liming program is a desperation move."

"Sweden and Norway have done much to reduce their own sources of SO<sub>2</sub> emissions and are continuing this process. But 80 per cent of the acid rain falling on the two countries originates in British and continental European industrial centres, and very little is done to control these sources."

"The Scandinavian population is following the research going on in Canada and the U.S. with great interest in the hope that it may show some way out of the predicament affecting countries on both sides of the Atlantic equally."

Dr. Brydges also noted that a workshop devoted to the study of the role nitrogen plays in forming acidic precipitation bogged down, simply because there still is a great gap in our understanding of the nitrogen cycle.

Dr. Dillon spent several days at the Norwegian Institute for Research in Oslo. He found that the acid precipitation problem may be considered more severe in Norway than in Sweden.

"Norway does not have a liming project," Dr. Dillon reported, "mainly because its acidified lakes are much less accessible to vehicles of any kind. This does not mean that these lakes are not used for sport fishing. Norwegians are very avid and hardy sport fishermen and think nothing of hiking a day just to reach their favorite fishing spot."

"In their own country they have done everything to eliminate acidic precipitation. For energy the country depends largely on electricity produced by hydro-power plants. The country of about eight million people is also paying a \$100-million per year premium for the import of sulphur-free oil."

"They have tried to show Europe what can be done but nobody seems to follow their lead..." said Dr. Dillon.



## First public EAA hearing deals with Etobicoke aquatic park

The first public hearing under The Environmental Assessment Act started on April 22, 1980, on an environmental assessment submitted by the Metro Toronto and Region Conservation Authority on its proposed Colonel Samuel Bois Smith Park in Etobicoke.

David Caverly of the Environ-

mental Assessment Board chaired the hearing and estimated that the presentations of the parties involved, the submissions from the public, the hearing of witnesses and their cross-examination, would take about 20 days. Other members of the board were Eleanor Lancaster and W. Roy.

The project of the authority calls for the construction of an aquatic park on the shore of Lake Ontario. The greater part of the park would be created in the lake by landfilling. The project includes a variety of recreational facilities, including a harbour for about 500 recreational vessels.

The hearing is being held at the request of the Ontario minister of the environment, Neil Mulvaney, director of the ministry's legal branch said. "The minister takes the position that we are involved in this hearing in a process of gathering and testing information leading up to a well-informed decision which must be taken by the Environmental Assessment Board."

"It is inherent in this approach that we do not regard this role as adversarial — we do not start out

with the object of bringing about acceptance or rejection of the proposal. From our point of view, the success of these proceedings is determined rather by the efficacy of the process and its workability. It is as important to us that the undertaking be reviewed fairly and thoroughly," Mr. Mulvaney said.

Since October 1976, the date of the proclamation of The Environmental Assessment Act, about 50 environmental assessments of a wide variety of undertakings have been submitted to the Minister. Of these 12 have received approval or approval under certain conditions.

In the review of each of these assessments, the public has been given the opportunity to request a formal hearing, but in none of the 12 cases were public hearings requested.

The principal reason for the lack of requests for public hearings seems to be, according to David Young of Environment Ontario's environmental approvals branch, that the government's review of the assessments has been available to all parties involved. The government's review and its conditions of approval were accepted as a sufficient warranty that the environment will be protected from effects of the project.

From the application of The Environmental Assessment Act to appropriate provincial agency projects, much valuable experience has been gained. In keeping with the government's commitment, and following extensive consultations with municipalities, the act will be extended to environmentally significant municipal projects shortly.

## Naturalists award for Dr. Landis



Dr. Henry Landis, Q.C., general counsel of the Ministry of the Environment, has received the distinguished service award from the Federation of Ontario Naturalists in recognition of his dedication to the betterment of

Ontario's environment. This dedication is reflected in his drafting of amendments to The Environmental Protection and Ontario Water Resources Act and the drafting of The Pesticides Act in 1973 and The Environmental Assessment Act in 1975. In 1979, Dr. Landis was responsible for the amendments to The Environmental Protection Act commonly known as the "Spills Bill" which makes the owners and persons having control of pollutants responsible for clean-up and restoration.

The award will be presented at the federation's annual banquet May 31 at Brock University, in St. Catharines.

Dr. Landis was called to the Bar in 1956 and joined the Ontario Water Resources Commission as solicitor in 1959. In 1970 his Bachelor of Law degree from Harvard Law School was changed to the degree of Doctor of Law.

In the same year he became general counsel of the Ontario Water Resources Commission and in 1971 he was appointed Queen's Counsel.

## Waste experts meet

The handling of hazardous wastes, acid rain and the lessons learned from the Mississauga derailment are the main topics that will be discussed at this year's Ontario Industrial Waste Conference.

The event will be held June 15 to 18 at the Prince Hotel in Toronto. The program planning committee has again managed to maintain — by its selection of speakers — the high standards familiar to participants at past meetings.

The full program of the conference and registrations are available from M.F. Cheetham, conference co-ordinator, Environment Ontario, Information Services Branch, 135 St. Clair Ave. W.,

Toronto, M4V 1P5 — (416) 965-1658.

The 10th Biennial Conference of the International Association on Water Pollution Research will also be held in Toronto from June 23 to 27 at the Sheraton Centre Hotel.

This event will provide a unique, world-wide forum for the exchange of knowledge on all aspects of water pollution. Pre and post-conference seminars, technical tours and excursions are also available to conference participants.

For information and registration contact K. Charbonneau, Executive Secretary, 10th International Conference c/o National Research Council, Ottawa, Canada, K1A 0R6 — (613) 993-9009.

## INCO order...

(continued from page 1)

"At the same time I stressed to him it was vital that the federal government tackle head-on the American inaction against acid rain. Ontario's announcement today should strengthen Mr. Roberts' hand in international negotiations."

Dr. Parrott said a demanding schedule has been set for the new Ontario-Canada Task Force which will proceed concurrent with INCO's own studies.

This program will identify all relevant abatement and control technologies that could be applied to the INCO and/or Falconbridge facilities. Financial and social implications of achieving various levels of SO<sub>2</sub> emissions, ranging

from current levels to zero discharge, will be estimated. These cost estimates will serve as the core data with which to assess any proposals.

The investigation is intended to develop information that will enable the government to develop rational, sound economic objectives and to clearly indicate the consequences of various policy alternatives.

"Ontario will continue to set an example and to lead in responding to the threat of acid rain," Dr. Parrott said. "Ontario's action program is well under way and our fight against acid rain goes on each day."

# Ontario: Let's all pitch in



Ontario in springtime is beautiful when it is not marred by the scrubby look of winter's leftover litter. The thoughtless, throw-away habits of a few people can spoil it for others at a time when our countryside is once again ready for full warm weather enjoyment.

Fortunately, many community-minded people care about this and want to help keep Ontario beautiful.

The 19,000 members of the Ontario Federation of Anglers and Hunters, for example, assisted by the Ministry of the Environment, are staging PITCH IN DAY on Saturday, June 7th.

Anglers and Hunters all over Ontario

are organizing special environmental PITCH IN projects to clean-up litter and junk from streams, shorelines, rural roads and trails, picnic areas and campsites and other areas which lack regular litter collection services.

You can help to fight pollution all year long.

Start by joining a PITCH IN project in your area.

Then, PITCH IN to Keep Ontario Beautiful. We all benefit when you do.



Ministry of the Environment  
Hon. Harry Parrott, D.D.S., Minister  
G.W.S. Scott, Q.C., Deputy Minister

## Let's keep Ontario beautiful.